Plug-in Advanced Telephone Card, 751317

Description and Installation

POSITRON
Positron Inc.

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DISCLAIMER NOTICE

Although Positron Inc. has made every effort to ensure the accuracy of the information contained herein, this document is subject to change without notice.

TECHNICAL CUSTOMER SUPPORT

Should a problem arise, contact your customer support department. If the problem cannot be resolved by your support department or if you have any questions, contact Positron's Technical Customer Support department at 1-888-577-5254.

1. The Plug-in Advanced Telephone Card

The Plug-in Advanced Telephone Card, model 751317, provides high voltage isolation between a telephone line and the drop side of one loop start telephone circuit (telephone, dial-up modem, fax, or loop start private branch exchange (PBX)), or the ground start trunk of a PBX. Its features include the following:

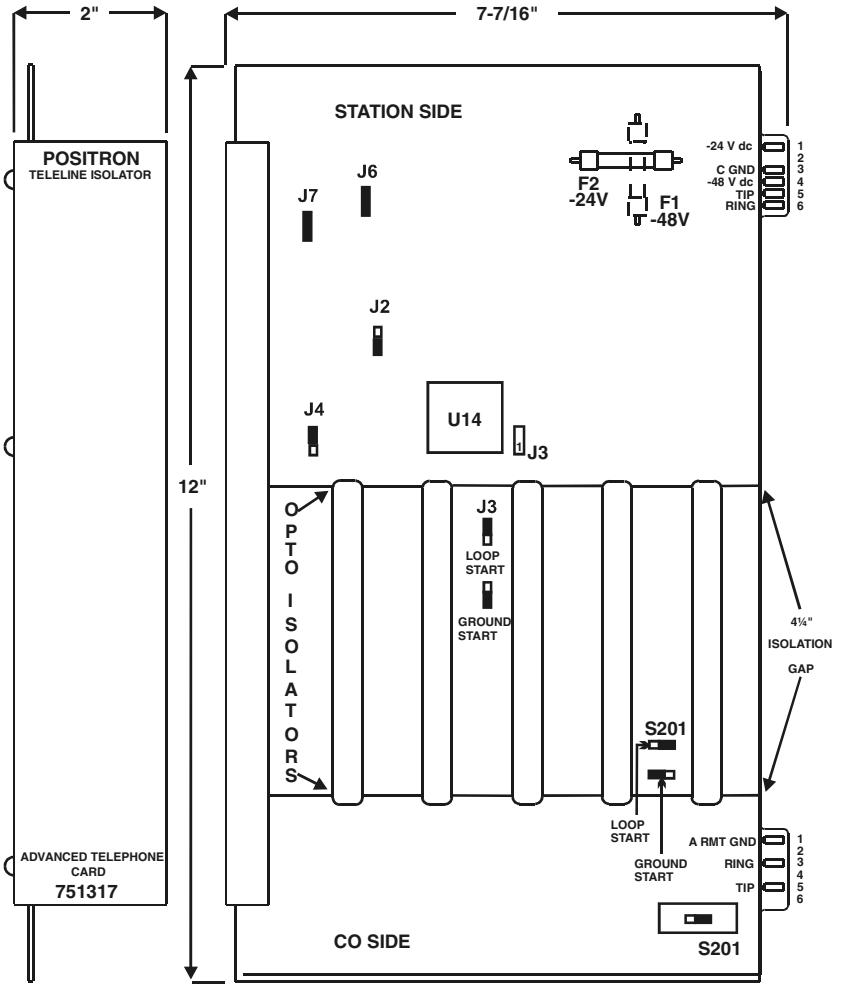
Note

For ground start application, the card must operate from a -48V dc supply.

- The card may be used with both the old and new generation Three, Five and Eight-card Teleline Shelf. The card is a direct replacement for the Teleline Universal Isolator Telephone Card, model 7501-01, the Plug-in PBX Trunk Card, model 7501-04, and the Plug-in Fiberline Telephone Card, model 751311.
- The card meets CS-03, FCC part 68, UL1950, BELLCORE's GR-506 sections 14.1.1 and 14.1.4.
- The card operates from either a -24 V or -48 V dc supply (provided by the shelf's power supply or from a source external to the shelf). It provides -48 V line feed when powered from -48 V.
- The card regenerates battery reversal presented on the Central Office (CO) side, to the Station side. This is useful when interfacing with modems and fax machines.
- The card regenerates forward disconnect when set for ground start.
- The card has full CO and Station side metallic and longitudinal protection which can withstand power crosses of 600 V rms and 40 A without damaging the card. It does this by using resettable fuses (positive coefficient thermistors) that will re-establish service after a fault.
- The CO side circuit components are powered from the CO battery feed.
- The card's sinusoidal ringing generator can ring up to five standard 500 type sets and track the CO side frequency, which enables selective ringing. The ringing generator meets BELLCORE's GR-506 sections 14.1.1 and 14.1.4.

For a view of the Plug-in Advanced Telephone Card, refer to Figure 1.

Figure 1 Model 751317 Component Layout (Only Major Components Shown)



Note

J2, J4, J6 and J7 are not customer selectable, they are used for in house troubleshooting. J2 and J4 must be in the position shown for the card to function properly.

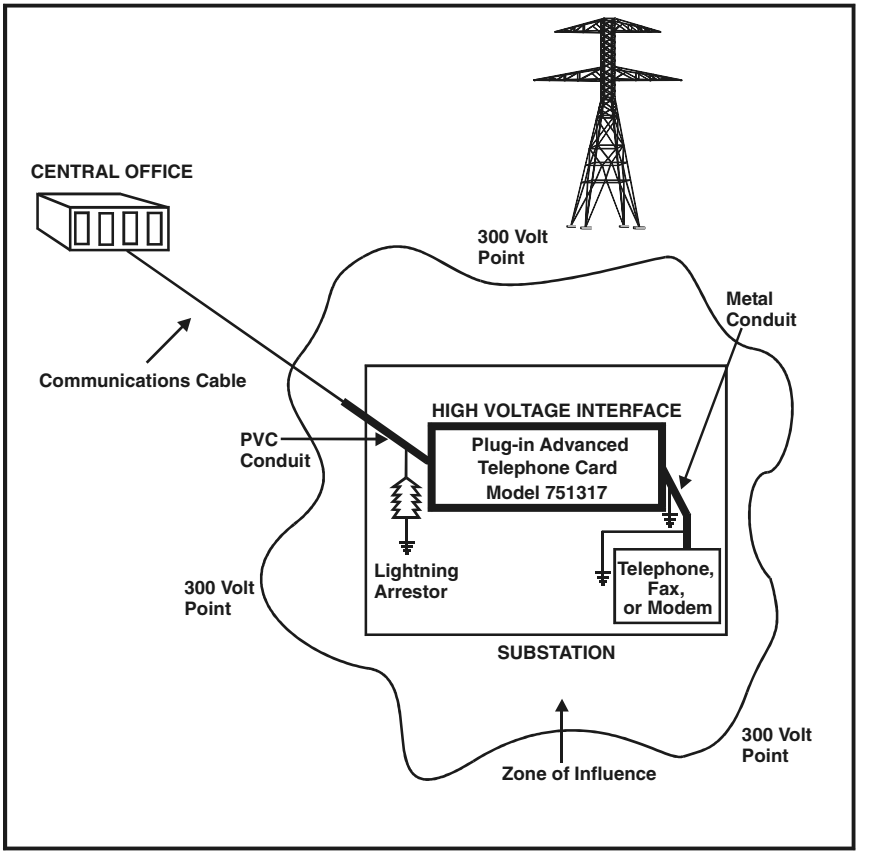
2. Applications

The applications of the Plug-in Advanced Telephone Card include the following:

- Loop start plain old telephone service (POTS)
- Fax and dial-up “smart” modems (up to 56.6 kb/s modem, speed of 37 kb/s if line permits)
- Loop Start PBX
- Dial-up remote meter reading
- Ground Start PBX
- Forward disconnect

For an illustration of the card’s applications, refer to Figure 2.

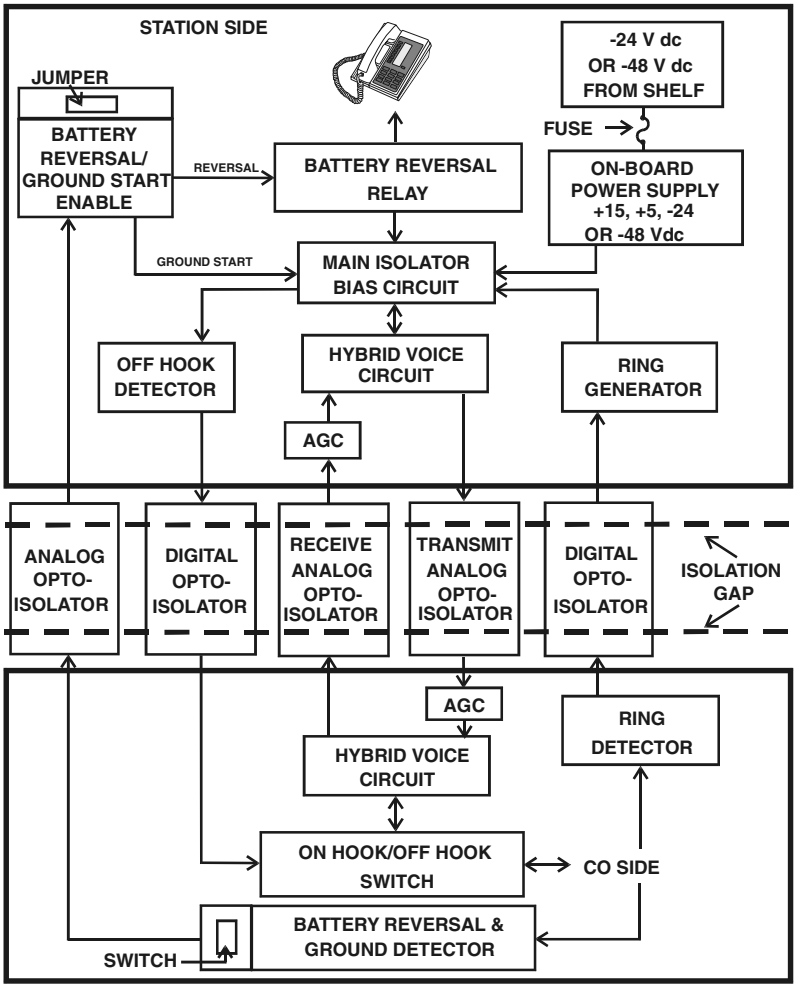
Figure 2 High Voltage Interface Applications



3. Hardware Description

The Advanced Telephone Card is comprised of two sides. The Station side is located on the upper portion of the card and the CO side is located on the lower portion of the card. The Station side is separated from the CO side by the opto-isolators which create a 4¼ inch isolation gap. For the card's block diagram, refer to Figure 3.

Figure 3 Block Diagram



The following is a description of the elements of the Advanced Telephone Card block diagram.

On Hook/Off Hook Switch

The On Hook/Off Hook Switch is a metal oxide semiconductor field effect transistor (MOSFET) current limiting circuit that is turned on by the off hook signal. When switched on, it permits the modulation of the hybrid voice circuits.

Hybrid Voice Circuits

The Hybrid Voice Circuits located on both the Station and CO sides of the card form a two-wire to four-wire to two-wire configuration that permits the separation of Transmit (TX) and Receive (RX) signals. These circuits also perform an impedance matching function such that the Station side impedance is reflected to the CO side. This renders the card effectively transparent for communication purposes.

Ring Detector

The Ring Detector is a bandpass filter centered about 30 Hz. It detects ringing signals from 13 Hz to 70 Hz, 50 V rms to 105 Vrms and sends pulses to the ring generator on the Station side, via a digital opto-isolator.

Battery Reversal & Ground Detector

The Battery Reversal & Ground Detector circuit sends a signal to the Station side whenever the battery is reversed on the CO side, and at a different frequency whenever a ground is detected on the Tip (on ground start selection only).

Digital Opto-Isolators

Each Digital Opto-Isolator consists of a light emitting diode (LED) and a phototransistor pair, coupled through a plastic fiber optic cable.They provide lightwave digital signal transmission across the isolation gap.

Transmit and Receive Analog Opto-Isolators

Each Transmit and Receive Analog Opto-Isolator is made of a LED and a photodiode pair, coupled through a plastic fiber optic cable. They transmit analog signals across the isolation gap.

Automatic Gain Control

The Automatic Gain Control (AGC) automatically adjusts the gain of the signal received from the Opto-Isolators so that the level out of the card is not affected by temperature or the aging of the LED.

Onboard Power Supply

The Onboard Power Supply is a switching power supply that takes the -24 V or the -48 V input and makes +15 V and +5 V for the board's circuitry.

Ring Generator

The Ring Generator receives pulses from the CO side and regenerates a sinusoidal ringing signal at the same frequency and synchronism as the CO side.

Off Hook Detector

The Off Hook Detector transmits a signal to the CO side to go off-hook when the telephone is lifted.

Main Isolator Bias Circuit

The Main Isolator Bias Circuit generates the off-hook and ring trip signals, and feeds a -24 V dc or -48 V dc (on-hook potential) bias to the Station side telephones.

Battery Reversal/Ground Start Enable

The Battery Reversal/Ground Start circuit detects the presence or absence of pulse on the analog opto-isolator and the frequency to generate the battery reversal and ground start signals.

Battery Reversal Relay

The Battery Reversal Relay is ON to reverse the battery and OFF for normal operation.

Analog Opto-Isolators

The Analog Opto-Isolators are used to transmit signals that are not "1" or "0", but are analog. Each consists of a LED and a photodiode pair, coupled through a plastic fiber optic cable

Fuse

The slow-blow Fuse F2 (4/10 A, 250 Vac) provides overcurrent protection. It is installed in -24 V or -48 V clips depending on the input voltage available (-48 V input allows -48 V line feed).

Jumper and Switch

Jumper J3 and Switch S201 are used to set the card for loop start or ground start operation. Set the card for ground start if the line uses forward disconnect, for example, fax, modem, and some voice-mail systems.

4. Technical Specifications

For a listing of the card's electrical specifications, refer to Table 1. For a listing of the card's physical specifications, refer to Table 2.

Table 1 Electrical Specifications (measured at 77°F or 25°C, 50% R.H.)

Parameter	Specifications
ISOLATION DATA:	
Isolation resistance	100 000 MΩ
Metallic surge	3 kV maximum
Insulation voltage	30 kVrms (42 kV peak)
INPUT VOLTAGE REQUIREMENT	Grounded -24 V or -48 V dc
MAXIMUM CURRENT CONSUMPTION (AT 25°c)	
At -24 V dc input:	40 mA idle 45 mA+loop current off-hook 85 mA ringing 1 phone 220 mA ringing 5 phones
At -48 V dc input:	35 mA idle 40 mA+loop current off-hook 60 mA ringing 1 phone 120 mA ringing 5 phones
POWER DISSIPATION INSIDE SHELF	
At -24 V dc input At -48 V dc input	1 W average 1.8 W average
ON-HOOK	
Ringing generator voltage	≥ to 75 Vrms with 1400Ω load with 13 to 70 Hz
CO side input ringing detection	50 Vrms to 105 Vrms, 13 to 70 Hz
Terminal resistance (CO side)	≥ to 10 MΩ at ± 100 V dc; ≥ to 30 kΩ at ± 200 V dc
OFF-HOOK (40 mA dc)	
Minimum loop current (CO)	20 mA dc

Parameter	Specifications
Minimum loop current (station)	Will detect off-hook down to 20 mA dc
Maximum loop current (station)	Current limiting at 60 mA dc
Maximum loop resistance (station, 20 mA dc)	850Ω maximum at -24 V, 1875Ω maximum at -48 V (including telephone)
Longitudinal balance (CO side)	>80 dB @ 60 Hz; >56 dB @ 4 kHz
Crosstalk (with adjacent card)	Better than -77 dB from 300 to 3400 Hz, measured at 0 dBm
Dial pulse distortion	<1%, measured at 14 mA threshold (output duty cycle w.r.t. input duty cycle)
NOISE (OFF-HOOK, 40 mA DC)	
Impulse noise (both sides)	Less than 1 count in 30 minutes above 54 dBrnc
Phase jitter	< 0.5°, 300 to 3400 Hz
Common mode rejection ratio (from CO to Station side, terminated in 600 or 900Ω)	>80 dB, 300 to 3400 Hz
Message circuit noise (quiet termination)	<10 dBrnC
S/N ratio (C message filter)	>35 dB at 0 dBm
SIGNAL	
Echo return loss (either side, opposite side terminated in 600 or 900Ω)	Better than 23 dB
Singing return loss (either side, opposite side terminated in 600 or 900Ω)	Better than 14 dB
Insertion loss (at 0 dBm)	-0.35 dB± 0.3 dB@ 1000 Hz
Frequency response (300 to 3400 Hz)	± 0.4 dB relative to 1000 Hz
Flatness	1 dB max from 150 to 10 000Hz
Rolloff	12 dB / octave from 30 kHz

Table 2 Physical Specifications

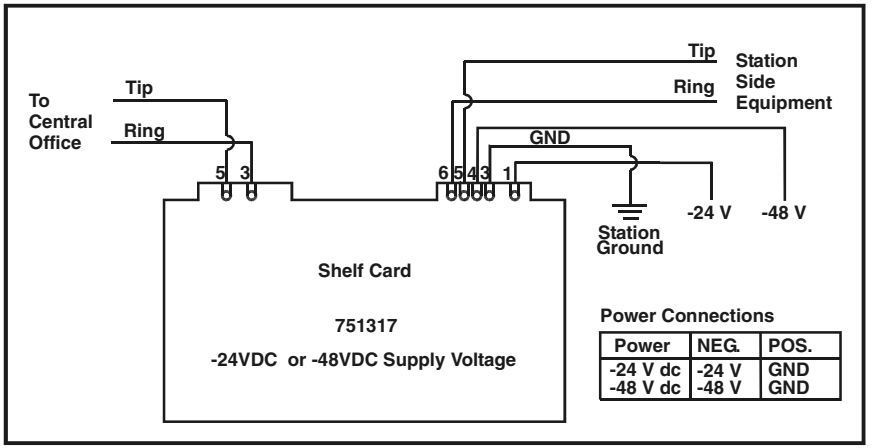
Parameter	Specifications
Operating temperature range battery	-4°F to +149°F (-20°C to +65°C)
Height	12” (30.48 cm)
Width	2” (5.08 cm)
Depth	7-7/16” (18.89 cm)
Weight	1.219 lbs (0.553 kg)

5. Installation

The Plug-in Advanced Telephone Card plugs into any slot of the Teleline Three, Five or Eight-card Shelf. However, the card must be installed into the slot which has been pre-wired according to the installation diagram of the specific shelf.

To view the Layout for a Loop Start PBX Trunk, refer to Figure 4.

Figure 4 Layout for a Loop Start PBX Trunk

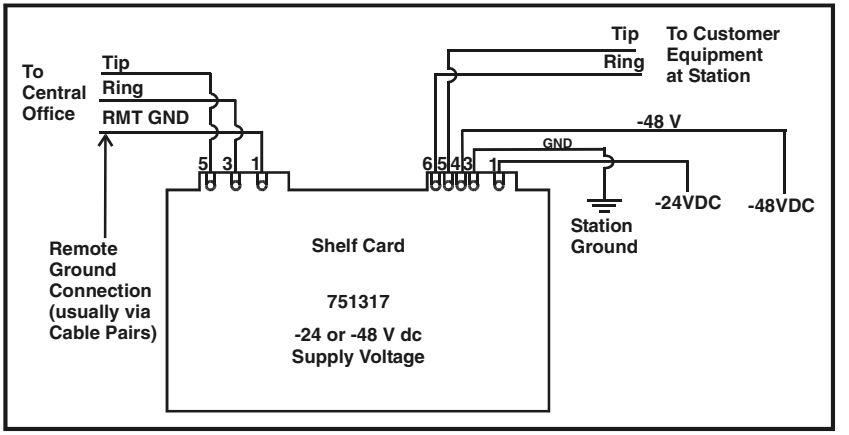


Note

1. This card provides a ringing generator.
2. This card can substitute for the 751311 card when 48VDC loop power is required on the station side.

To view the layout for a Ground Start PBX Trunk, refer to Figure 5.

Figure 5 Layout for a Ground Start PBX Trunk



Note

1. This card provides a ringing generator.
2. The REMOTE GROUND on the CO side is a signalling reference ground and should be less than 900 Ohms to the Central Office for each circuit.
3. For GROUND START circuits the card MUST be powered from -48V.

Caution

- Stand on a thick rubber mat and wear rubber gloves during the installation. It is preferable to perform these procedures on a clear dry day when a Ground Potential Rise (GPR) or transients are less likely to occur.
- This card utilizes CMOS circuitry that can be damaged by static electricity. Observe normal CMOS handling procedures to avoid static discharge. Manipulate the card exclusively by the faceplate to prevent any damage to the card and to limit the possibility of electric shock. When moving the card, carry it in an ESD safe container or the antistatic bag, provided with the card. Failure to follow ESD precautions may void the warranty. For further information concerning ESD precautions, contact Positron's Customer Support department.

1. Unpack the Advanced Telephone Card from its protective box and shielded anti- static bag.
2. Confirm that the unit is an Advanced Telephone Card by identifying the name and model number on the faceplate of the card.
3. The unit is factory-installed in the F2, -24V position (horizontal). The vertical position, F1, designates the -48V option.
   - ► Verify that the fuse F2 is intact and installed in proper clips.
   - ► If the -48V option is required, simply insert fuse F1 into the appropriate fuse clips. To view the location of F1 and F2, refer to Figure 1.
   - ► If the fuse is blown, replace it once; if it blows again, contact Positron for a card replacement.
4. Verify that Jumper J3 and Switch S201 are set correctly (ground start or loop start). To view the location of Jumper J3 and Switch S201, refer to Figure 1.
   - ► If the circuit is a ground start, make sure you have a good ground connection.

Attention

The remote ground of the CO side must be brought from the CO on a separate pair (one per ground start circuit).

DO NOT use the cable sheath for ground connection.

DO NOT connect the remote ground to station ground.

5. The card must be inserted rightside up and may be plugged into the shelf with the power ON or OFF.
   - ► Slide the card into its designated pre-wired shelf slot until the two card-edge connectors lock into the Teleline shelf and the retaining clip snaps into place.
6. Verify the installation by making and receiving a call.

6. Service and Support

Technical Customer Support

Positron is committed to providing excellent ongoing technical support to its customers. A team of specialists is always available at our Technical Support Center in Montreal for either telephone consultations or on-site visits, to assist Field Technical personnel in the maintenance and troubleshooting of Positron equipment. During normal business hours, (8:30 a.m to 5:00 p.m. EST), any one of our Technical Customer Support (TCS) staff may be reached by dialing 1-888-577-5254 from anywhere in the continental United States or from Canada. Customers outside North America should dial 1-514-345-2200. Staff may also be contacted via fax at 514-345-2271 or e-mail at powerdivision@positron.qc.ca.

Positron TCS staff are available to provide technical assistance and/or to supervise the installation of Positron equipment. Assistance in the planning, configuration, and implementation of the installation will be provided as requested. Arrangements and pricing information regarding field assistance may be obtained by contacting the Technical Customer Support department. Please contact Positron for scheduling at least four weeks prior to the actual requested visit date.

Customer Training

Positron offers full customer training courses, as requested. Seminars are also available on High Voltage Interface (HVI). For more information, contact a customer representative by dialing 1-888-577-5254 or use our e-mail address, powerdivision@positron.qc.ca.

Warranty

Positron warrants that all equipment shall perform in accordance with Positron's specifications. The warranty remains valid for five (5) years from the date of shipment. The warranty will be honored provided that the equipment has not been abused and provided that the equipment has been installed and used in accordance with Positron's installation instructions and specifications. The warranty fully covers workmanship, materials and labor.

This warranty is in lieu of all other warranties, whether expressed or implied, including warranties of merchantability and fitness for a particular purpose. Positron guarantees that all equipment shall perform in accordance with Positron's specifications. Positron disclaims any warranty that Positron

equipment will meet customer requirements beyond the product specification. Positron disclaims any warranty that operations will be uninterrupted or error free.

Repair Service

Positron Inc. offers repair services by which customers can count on timely and quality repairs, regardless of customer location.

All warranty repairs are performed at no cost. Positron reserves the right to repair or replace any equipment which has been found to be defective.

For information about out-of-warranty repairs, contact Positron's Repair department at 1-800-661-4911 (from anywhere in the continental United States or from Canada) or dial 514-345-2228. Due to the varied nature of repairs, no one time frame for turnaround can be guaranteed. However, average turnaround time is two weeks from date of receipt. In emergency situations, special arrangements can be made by contacting our Repair department. All repaired items are warranted for a period of 90 days. Bulk repairs (more than five items) will require additional processing time, therefore, please take this into consideration when requesting a Return Material Authorization (RMA) number.

Before returning any items to Positron for repair, warranty repair or replacement, call the Repair department to obtain an RMA number. Parts returned without RMA numbers cannot be accepted. The RMA number must always be clearly marked on all boxes and crates and on all shipping documents.

Items under warranty are to be shipped prepaid to Positron and will be returned prepaid to the customer. Items that are not under warranty are to be shipped prepaid to Positron and will be returned prepaid with freight charges included on the invoice. Positron cannot accept items shipped collect. A purchase order number is required for all repairs.

To accelerate the repair process, whenever possible, customers should include a report detailing the reason for return with the unit(s) being returned. Also, please include the name and phone number of a person who can be contacted should our Repair department need further information.

When packing items being returned for repair, please ensure that the item(s) is properly packed to avoid further damage. Teleline Isolator cards should never be shipped while installed in a shelf; this will cause damage and will almost invariably extend the repair period.

Ordering Information

Positron's Teleline equipment can be ordered by telephone, facsimile, or by mail. All orders should be directed to the Positron Inside Sales department. Ordering by telephone, or facsimile will eliminate any delays arising from postal services. However, a hard copy purchase order is required as a confirmation. In addition to the model numbers of the items being ordered, the following information is required:

- Company name, contact name and telephone number
- Purchase order number
- "Ship To" address
- "Bill To" address
- Date required on site

All orders must be followed by a confirming order. Equipment will not be shipped until such confirmation is received.

For a list of our contact information, refer to Table 3.

Table 3 Positron Contact Information

Address	Positron Inc.
	5101 Buchan St.
	Montreal, Quebec, Canada
	H4P 2R9
Main telephone number	514-345-2200
Customer Service department telephone number	514-345-2200, 1-888-577-5254
General e-mail address	powerdivision@positron.qc.ca
Customer Service department fax number	514-345-2271
TCS department toll-free number	1-888-577-5254
TCS department fax number	514-345-2271
TCS department e-mail address	scarbonaro@positron.qc.ca
Repair department telephone numbers	514-345-2228 or 1-800-661-4911
Customer representative e-mail address	customerservicepower@positron.qc.ca